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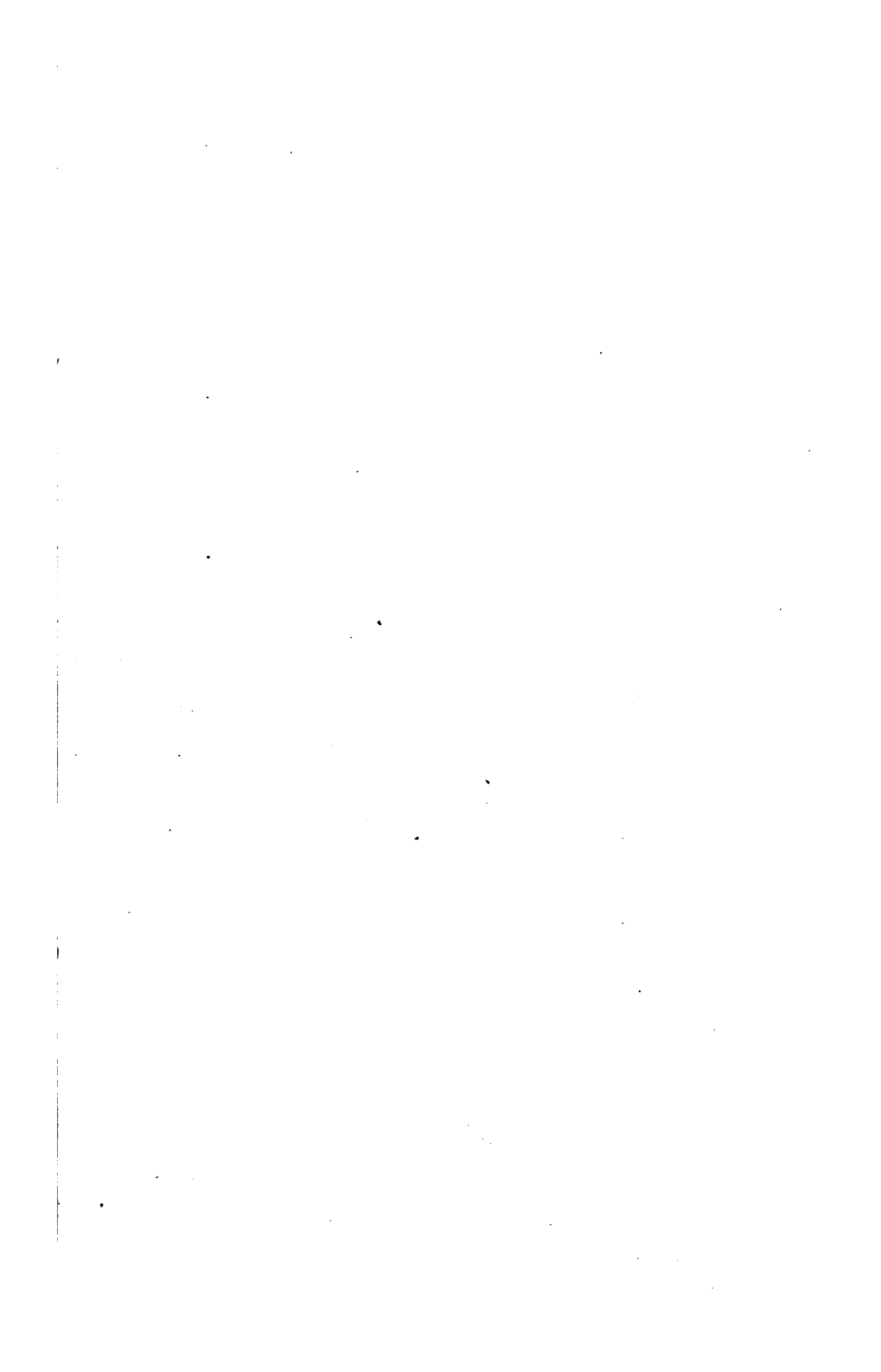
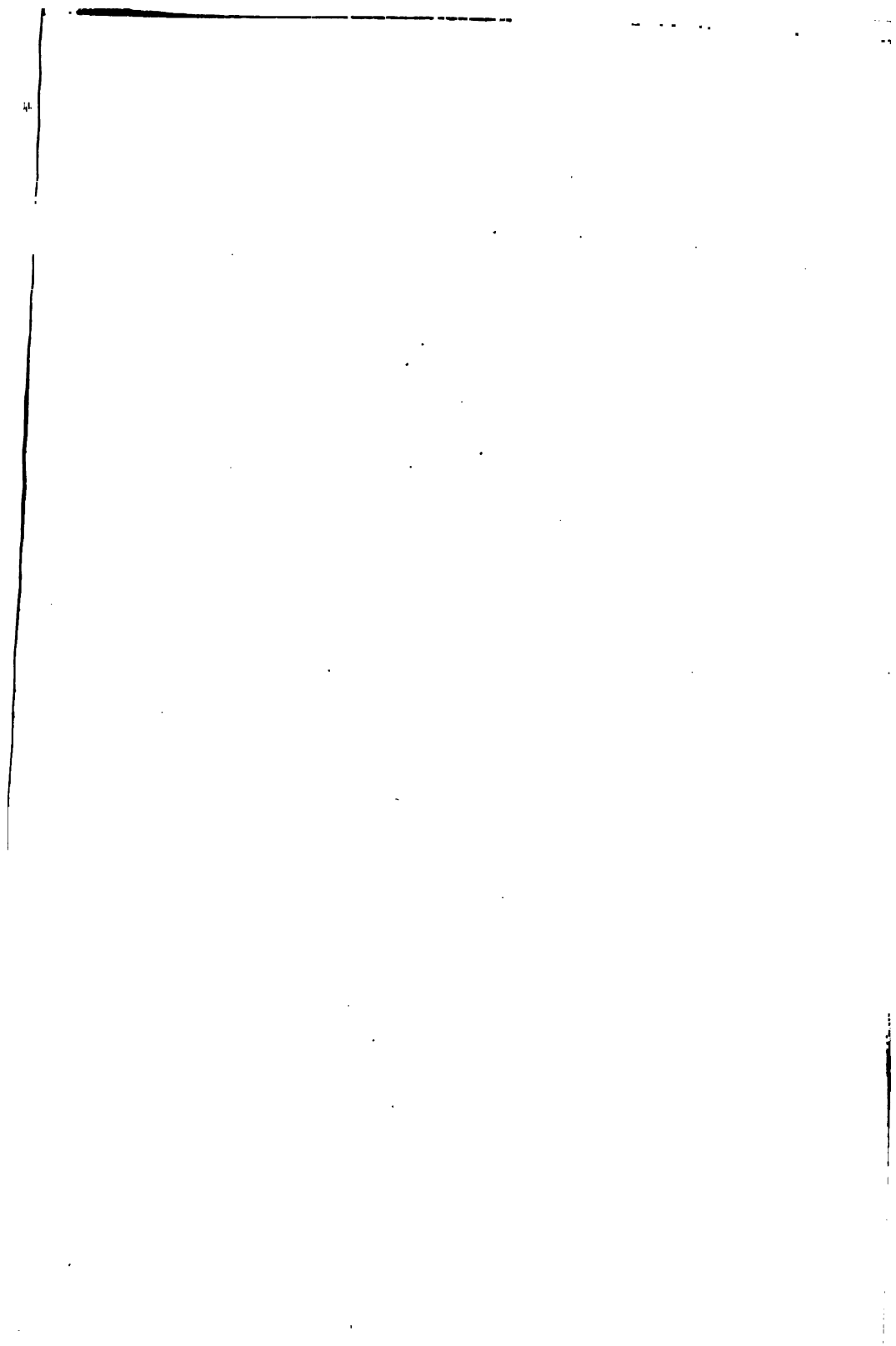


Fig. 1.



Fig. 2.

EARLY HUMAN OVA.



PRACTICAL OBSERVATIONS

ON

ABORTION.



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PRESIDENT OF THE WESTMINSTER MEDICAL SOCIETY,
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&c.

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SAMUEL MERRIMAN, M. D. F. L. S.

&c. &c.

THESE OBSERVATIONS ARE INSCRIBED

IN TESTIMONY OF

THE HIGH ESTEEM IN WHICH
HIS CHARACTER AND ACQUIREMENTS ARE HELD,

BY HIS FORMER PUPIL,

J. S. STREETER.

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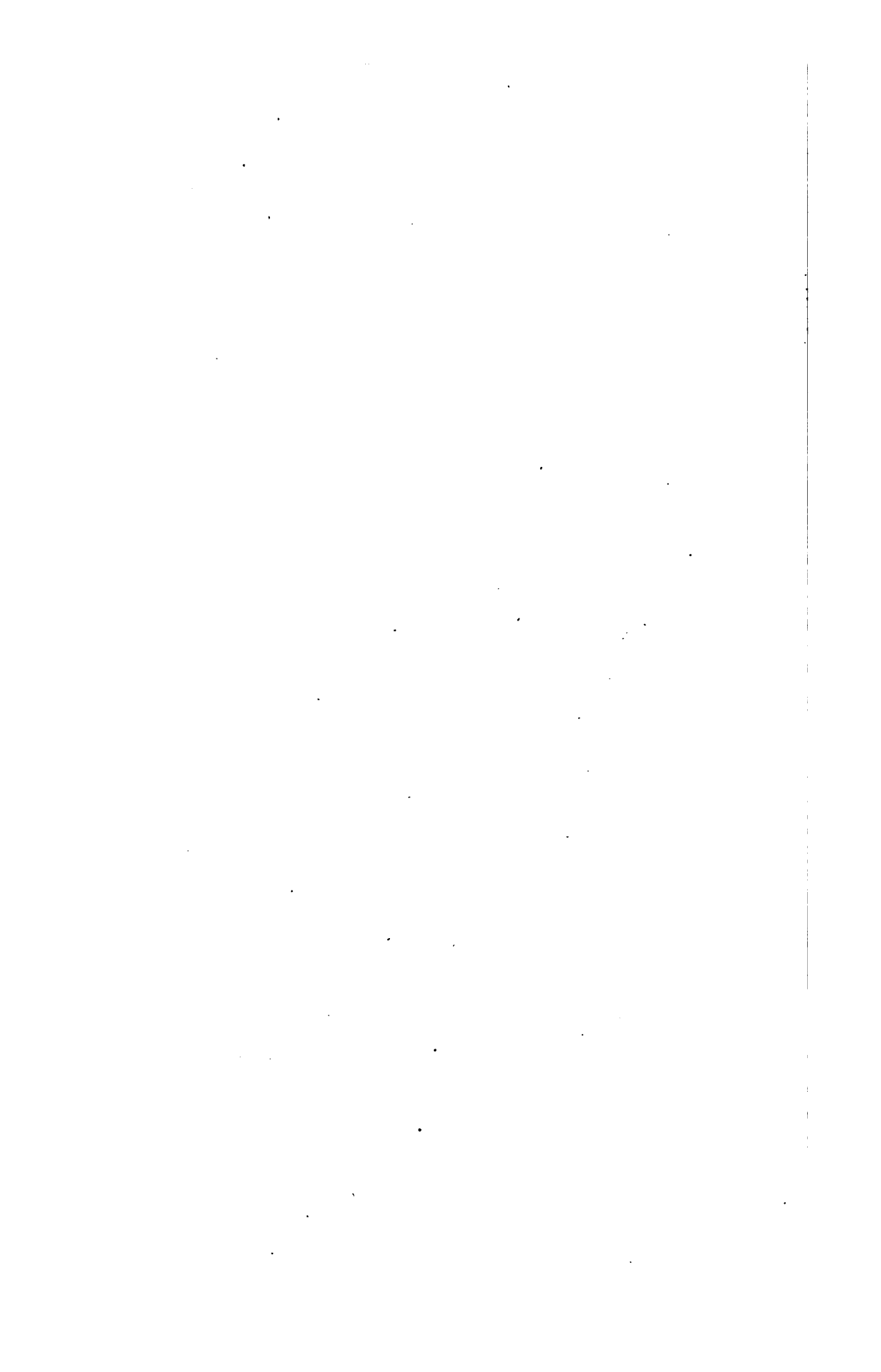


Fig. 1.



Fig. 2.

EARLY HUMAN OVA.

1

2

3

4

estimated, not by Collegiate distinctions, but by the amount of science employed in its service, and by the demands of society for its application. I have added such Plates and Wood-cuts as seemed requisite to convey the necessary illustrations, and have only to express my hope that the somewhat frequent use of "the most egotistical of the pronouns," which necessarily accompanies a *viva voce* communication, will not lead to the belief that it is habitual—the result of overweening confidence in self-formed opinions. The reader will bear in mind that the object of Societies is to elicit the personal experience and judgment of their members, rather than elaborate digests of the opinions of medical writers.

In turning to the recorded investigations on the nature and uses of the vesicula umbilicalis, first figured as an hydatid of the cord by Albinus, in 1754, and subsequently without a knowledge of its real nature by Wrisberg and Wm. Hunter, it seemed to me, that the remarks of a German physiologist, I believe Döllinger, on the subserviency of this organ to the first development of the embryo, had not

received all the attention they merit. They were introduced to the notice of the profession in this metropolis in the last of those admirable Courses of Lectures on the Comparative Anatomy of the Invertebrate and Vertebrate Series of Animals, which were delivered by Mr. Green, at the Royal College of Surgeons in 1824, 1825, 1826, 1827, and 1828,—delivered by him for the especial purpose of enforcing the necessity of and giving an impetus to the study of Physiology on a wide and extensive scale, as the only safe preparation for the practical duties of every branch of the Healing Art.

After speaking of the allantois in the mammalia, he went on to say that “a considerable degree of importance has been attached to the vesicula umbilicalis from the researches of a German physiologist. He attaches the most important part of the development of the embryo to it, and considers it may be compared to the yolk-bag in birds, which in them evidently supplies the materials for the formation of the chick ; and he derives this opinion, first, from the vesicula umbilicalis

containing a fluid matter more like chyle than any other of the membranes ; and, secondly, from the circumstance of the vascular communication between the vessels of this organ and those of the foetus, viz., the vasa omphalo-meseraica ; but there is no communication of the vesicula umbilicalis with the intestine, therefore it is probable in the mammalia you have only the preparation of the blood, and not any deposit of material in the intestinal canal."

This negation of vitello-intestinal communication has been shown by later inquiries to be incorrect ; indeed it is now satisfactorily proved that the human embryo, as well as that of the mammalia generally, is formed on a yolk sack, (the umbilical vesicle is the remains of this,) in a manner quite analogous to what has long been familiarly known to us in birds. I therefore thought it right to illustrate this part at some length in the Society by a series of diagrams, founded on those early-aborted ova of which Wood-cuts are given ; and also one of a congenital malformation in an adult recorded by Dr. Hosack, which goes far to

show that the ileum is the part where the vitello-intestinal duct naturally terminates ; a species of evidence which may often be usefully employed in determining such anatomical matters.

The practical points which I was anxious to enforce on the members of the Society were a more exact distinction between the premonitory and the essential symptoms of miscarriage, the impropriety of the use of Opium, and the advantage of that of Ergot during the presence of the latter, and the disadvantages of a casual or intentional rupture of the membranes during the process of abortion. Lastly, I wished to direct attention to the impossibility of laying down rules for the prevention of miscarriage in any subsequent pregnancy, without first determining, from accurate examination and competent knowledge of embryology, the normal or pathological conditions of the aborted ovum, and hereby arriving at the real cause of the miscarriage, instead of indolently and vaguely assigning it to the last accompanying circumstance.

I have only in conclusion to acknowledge my obligations to various members of the Society for

the use of their valuable collections ; to that profound physiologist Dr. Sharpey, for his frank and unreserved communications on embryological subjects, for assistance in dissecting some of the specimens, and for first suggesting that every vesicle found within a chorion, is not necessarily an amnion, but may be a degenerated yolk-sac ; and to that learned and excellent physician, Dr. Robt. Willis, for much practical information on this and very many other occasions.

*20, Harpur Street,
March 1, 1840.*

EXPLANATION OF THE PLATES.

PLATE I.—*Early Human Ova.*

Fig. 1.

An ovum which was passed in abortion by a patient 21 hours after returning from a party where she had danced the whole evening. The decidua vera was expelled in shreds partly before and partly after the ovum itself. The reflexa is thicker and denser than natural, but the chorion and amnion are perfectly normal. The embryo and umbilical cord are seen in their natural condition about the fifth or sixth week. The vesicula umbilicalis and its pedicle are also in a very perfect state. The vesicle is situated on the outside of the amnion but within the chorion. When the ovum was first opened the vesicle was imbedded in the reticulated tissue which naturally exists between the chorion and amnion, and it was situated at the upper part of the preparation close to the placental extremity of the cord, but it has now fallen down and is represented hanging from the middle of the umbilical cord. The pedicle, uncovered by the amnion, dips into the placental extremity of the cord, and passes with the umbilical arteries and vein into the body of the embryo. See also pp. 18—20.

Fig. 2.

An ovum showing a perforation at the cephalic extremity of the embryo which communicates with the brain. The aperture has been occasioned by enlargement and rupture of a cerebral vesicle. The remains of the umbilical vesicle are distinctly visible forming the circular spot between the amnion and chorion on the left side of the figure. Further described p. 36.

PLATE II.—*Human Ovum with imperfect Fœtus.*

An ovum showing imperfect development of the caudal extremity of the embryo, and also an abnormal state of the membranes. It is described at length p. 35.

a Part of the decidua vera.—*b b* Decidua reflexa.—*c c* Cut edges of the reflexa.—*d d* Villi of the chorion.—*e* Amnion.—*f* Fœtus.

PLATE III.—*Diagrams illustrating the structure of the Graafian Vesicle and the ovum.*

Fig. 1.

1. Peritoneal coat.—2. Proper coat of ovary.—3. Outer coat of Graafian vesicle.—4. Inner coat of Graafian vesicle.—5. Granular membrane enclosing the Graafian fluid.—6. Space occupied by the Graafian fluid.—7. Proliferous disc.—8. Cumulus.—9. Pore.

Fig. 2.

a Outer coat of ovum.—*b* Inner coat of ovum.—*c* Germinal vesicle.—*d* Germinal spot.

Fig. 3.

1. 1. Section of the walls of the uterus.—2. 2. Lining Membrane of do.—3. 3. Decidua vera.—4. 4. Decidua reflexa.—5. Chorion.—6. Yolk vesicle.—7. Villi of the chorion in contact with the uterus and enlarging.—8. Villi of the chorion covered by the reflexa and wasting.—9. Cervix uteri.

Fig. 4.

1. 1. Fundus and body of the uterus.—2. 2. Lining membrane of do.—3. 3. Decidua vera.—4. 4. Decidua reflexa.—5. 5. Chorion.—6. 6. Reticulated tissue of Velpeau.—7. 7. Amnion.—8. 8. Placenta.—9. 9. Cervix uteri.—*a* Umbilical artery.—*b* Umbilical vein.—*c* Umbilical artery.—*d* Pedicle of Umbilical vesicle.—*e* Place where the pedicle bifurcates into omphalo-meseraic artery and vein.—*f* Fœtus.—*g* A fold of intestine projecting from the body of the fœtus into the cord.—*h* Remains of the vitello-intestinal duct, which, when persistent, forms a diverticulum of the ileum.—*i* Umbilical vesicle lying in the reticular tissue.





HUMAN OVUM WITH IMPERFECT FETUS.

CHAPTER I.

GENERAL OBSERVATIONS.

THE practitioner of the healing art never fails to find great advantage, in carefully reviewing, from time to time, the treatment adapted to those diseases and accidents, which from their emergency require instant attention, which leave him but few moments for reflection, and none for summoning to his aid those of accredited rank, or to whom extensive opportunities have given superior information. It is then that he must rely on himself for those judicious and instantaneous measures, which can alone ensure safety to his patient and satisfaction to his own conscience. The purple stream will not cease to flow from a divided vessel or an uncontracting uterus,—inflammation will not delay its destructive course in a hernial tumour,—nor will suffocation spare the victim of laryngeal obstruction, while time is wasted in seeking for the sanction of authority

to adopt those bold and decisive measures, which can alone place the sufferer beyond the reach of danger.

The practitioner of midwifery above all others must be prepared for every emergency that may arise; his head must ever be cool, his hand always ready, and he must be able to emancipate himself from the distraction of surrounding circumstances, and to turn a deaf ear to the suggestions of friends and attendants, who stupified by fear, either await his directions with superstitious faith, oppose him with vain objections to indispensable measures, or on the contrary show themselves ignorantly and mischievously meddling. It is on occasions like these that the practitioner feels the greatness of his calling,—that he is to verify the proud motto of his class,

“ *Opiferaque per orbem*

Dicor,”

and to gain that inward Christian prize, which is more estimable than the outward Roman wreath, the consciousness of having saved the life of a fellow-creature.

He, indeed, who has been summoned in anxious haste to the bedside of a patient lying blanched by profuse hæmorrhage, who has seen the

sunken eye, the bloodless lip, and the tremulous and flaccid limb,—who has felt the jerking and faltering pulse, and has listened to the failing voice, will need but little inducement to discipline his resources for the treatment of hæmorrhage in any shape. The hæmorrhage accompanying miscarriage in particular, is often alarming, and the management of cases of threatened or actual abortion, highly important. The prevention of abortion in subsequent pregnancies is so desirable, and the knowledge of the morbid states of the ovum leading to its occurrence (although steadily advancing with the rapid progress of embryological science) is still so far from being complete, that I thought there was room for a brief Essay upon this subject. I have therefore endeavoured, in the succeeding chapters, to lay down those distinctions and practical modes of prevention and treatment which physiological, pathological, and therapeutical science seemed to require, and which I have found from my own experience best adapted to meet the varying circumstances of each individual case.

Much ingenuity has been exercised to draw the line between miscarriage and premature labour; to me it appears that abortion or miscarriage (using the terms synonymously) may be best

defined by the physiological distinction chosen by Dr. Granville, as the premature extrusion of the ovum before its foetus is capable of maintaining life, independent of the parent,—if it is so capable, it is premature labour and not abortion. Dr. Denman, selecting time as a distinctive mark, considers all expulsions of the foetus before the termination of the sixth month, as *abortions*, all in the last three, as *labours* regular or premature; and he assigns as the practical reason for this distinction, that before the termination of the sixth month, they neither require nor allow of manual assistance; a rule, as we shall presently see, far too general, and well refuted by some remarks of his own in a subsequent part of the same paragraph, where he says, “On this as well as many other occasions, there is room to observe, that when every doctrinal distinction has been made, no precise rule can be formed for the conduct of the practitioner in every possible situation in which a patient may be placed, but he must ever be at liberty to exercise his own judgment.” To this I will add, that it is the acquirement and the maturing of this judgment by exercise, which distinguishes the good practitioner from those, whose memories are only stored with medical literature on the one hand, or empirical routine on the other.

Some authors, among these, Mason Good, have made a further distinction between miscarriage and abortion, restricting the term *miscarriage* to extrusion of the ovum within the first six weeks after conception,—*abortion*, to its extrusion between six weeks and six months,—and *premature labour* to its extrusion after that period. Distinctions founded on time are, however, of little value at the bedside, and, as far as I am aware, lead to nothing like useful result. The legislature indeed still recognizes distinctions, which science, enlightened morality, and the pure and benevolent principles of the New Testament, alike repudiate, distinctions grounded on a scholastic theory, and which can now only be regarded as off-shoots that have too long survived their parent stem, and which shock the inherent moral feeling of our nature by their inconsistency and injustice. I allude to the distinction still preserved in criminal cases between the procuring abortion *before* and *after* the period of quickening, and to the staying of execution of pregnant criminals only *after* that event has taken place. In civil cases the legislature recognizes the existence and confers rights on the foetus from the moment of conception, while in criminal jurisprudence it decrees that, during its embryonic stage of being, it is only a part of

the viscera of the pelvis, and unless its guilty parent has quickened, consigns it to destruction for maternal crime in which it could not participate. So late as March 16, 1831, Baron Pennefather declared from the bench, that pregnancy alone without quickening of the child is not sufficient for staying execution.

Physiology authorizes no such boundary line, it recognizes no principle, which tends to put a lower value upon human existence at one period of gestation than another; the two states of being bear the same relation to each other, which the newly born child does to the adult man, and "to extinguish the first spark of life," to use the language of Percival, "is an offence of the same nature, both against our Maker and society, as to destroy an infant, a child, or a man."

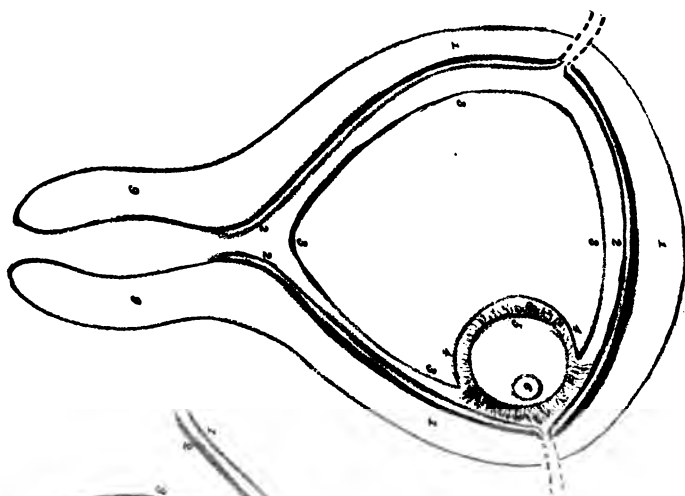


Fig. 3.



Fig. 2.

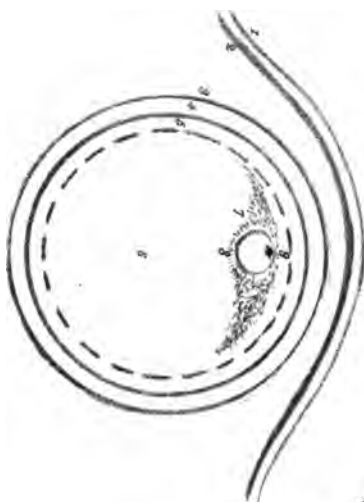


Fig. 1.

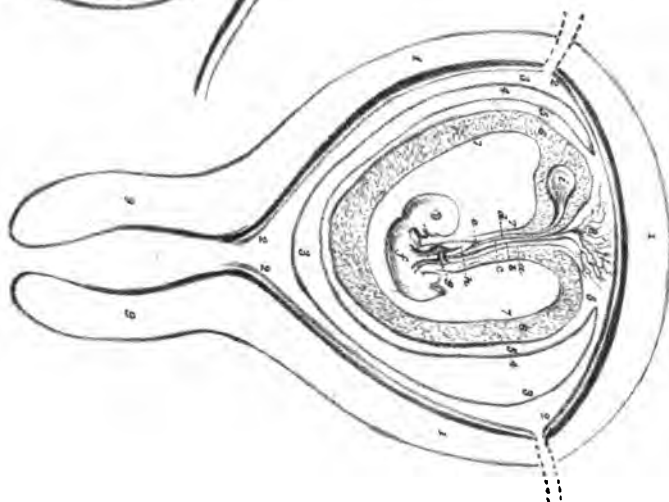


Fig. 4.



CHAPTER II.

STRUCTURE OF THE OVUM.

As it is my intention to show hereafter that abortion in the earlier periods of pregnancy is in most instances owing to imperfection or morbid conditions of the embryo, or its ovarian envelopes, on the one hand ; or to morbid action of the interior of the uterus leading to abnormal states of the uterine coverings or connecting structures, incompatible with the development or life of the fœtus, on the other ; it will be requisite to state the principal points already made out in the structure of the human ovum prior and subsequent to its attachment to the uterus of the mother.

Dr. Granville has justly observed, in his graphical illustrations of abortion, that "it is impossible to thoroughly and accurately comprehend the mode in which abortion takes place without being previously acquainted with the origin, formation, progress, and metamorphosis of the

fœtus," (I would here substitute the word ovum,) "and its connection with the mother,"—he has more pithily, perhaps, than correctly, termed this "the biography of the human fœtus." This thorough knowledge, however desirable, was not at that time, and has not even at the present day, been completely obtained. Since indeed Baer's great discovery in 1827, of the existence of the ovum in the ovary of the mammalia, our acquaintance with this branch of science has been much advanced by the combined labours of Continental and British physiologists, and obstetric teachers will soon feel called upon to pay more attention to the embryological part of their course.

The methods employed to obtain this knowledge have been,

First, Direct observation on the contents of the ovaries and uteri of females who have died from accidental causes at early periods of pregnancy.

Secondly, Examination of ova thrown off by the process of abortion, and,

Lastly, Accidental or experimental observations on the ova of several of the mammalia, and on those of the inferior animals.

Opportunities of the first kind are comparatively rare, and it is much to be regretted that so few have preserved the impregnated uterus with

its contents *in situ* prior to and during the third month of gestation, or indeed have accurately recorded their examinations of these cases. I am only aware of four such specimens being preserved : Sir W. Blizard's, in the Museum of the Royal College of Surgeons, Dr. Agar's, in that of the Royal College of Physicians, Dr. Robt. Lee's, figured in the seventeenth Vol. of the Med. Chir. Trans. and that of the late Dr. Sweatman, in the Museum of the Middlesex Hospital, and which pecuniary disagreement, between that gentleman and the council of the Society, unfortunately prevented from appearing in a subsequent volume of the same work.

The ova thrown off by the process of abortion have been very largely employed. Even Dr. Wm. Hunter is stated, by Dr. Robt. Lee, to have entirely derived his description of the gravid uterus from those prior to the third month, he having *never inspected* the parts *in situ* at an earlier period. The latter part of this statement cannot however be strictly accurate, for the drawing of the uterus of a woman who died from the hæmorrhage attending the effort at abortion, and showing the ovum still adhering to its fundus, about the seventh week of pregnancy, is stated by Dr. Denman to have been executed under the

inspection of the late Dr. Wm. Hunter, and Dr. Underwood (Pl. 7. Engravings, &c., by Denman, 1815.) Few of these ova however present entirely natural or normal characters, and they often undergo such chemical alteration by the delay, or such mechanical injury or change of form from the pressure they are subjected to, in the process of expulsion, that we must not, as Velpeau has remarked, take all the statements of their describers as accurate, or we shall perpetuate their mistakes, and involve ourselves in inextricable errors.

Still these enquiries into the states of the ovum in instances of premature expulsion, when made while recent, if correct and sufficiently extensive, and not limited to a few favourite specimens in our own possession, are fertile in results. Dr. Denman, while recommending a review of the whole subject of abortion, has well observed, "that in every collection there must be some example, which may enable us to distinguish the different parts of which an ovum is composed, the proportion which they bear to each other at different periods of pregnancy, and sometimes the process of uterogestation which failed." Moreover, their frequency and abundance make them accessible to

every one of moderate industry, and they admit of easy preservation for reference or future study.

Experimental observations on animals have much in them that is repugnant to our higher feelings; they require much familiarity with the subject, great care in their execution, and a candour and judgment unbiassed even by enthusiasm. Their results are only analogical, furnishing certainly the strongest presumptive, but not positive, evidence of identical occurrence in the human subject.

From what I have seen and perused I believe our knowledge of the human ovum may be stated to be nearly as follows. The human ovum (Pl. 3. Fig. 2.) is formed by the ovary in the vesicle of De Graaf; this vesicle is not however to be confounded with the ovum itself, it merely encloses that body in rather a complex apparatus. Each vesicle (Pl. 3. Fig. 1.) consists of an outer 3 and inner 4 layer, which are the parts more immediately concerned in the production of the corpus luteum after impregnation. Within these layers the special apparatus that contains the ovum is found, consisting of, 1st. A granular membrane 5 enclosing the Graafian fluid 6; 2nd. An aggregation of coherent granules 7, named the proligerous disc, having an elevation 8 directed inwards named cumulus, and

an aperture 9 directed outwards and named its pore. Within this disc the real ovum Fig. 2. is lodged, which consists of, 1st. An external thick envelope (a); 2nd. A granulary membranous sac containing a thin fluid, the yolk (b); 3rd. A minute vesicle (c) named the germinal vesicle, the analogue of the vesicle of Purkinje in birds.

Prior to the access of the male, this germinal vesicle is believed, from analogy, to become ruptured, and subsequently to impregnation, at the spot where it has shed its contents, the germinal membrane, or blastoderm forms, the analogue of the cicatricula, a membrane in some classes forming a partial, in man and several of the mammalia a complete, covering to the yolk, and in which the primitive or first trace and subsequent evolution of the embryo take place.

From the experimental observations of T. Wharton Jones on rabbits, it is probable, that the ovum after impregnation acquires a gelatinous envelope while still in the ovary, and that covered with this gelatinous envelope, it escapes from the Graafian vesicle by a combined process of pressure and absorption,* and enters the Fallopian tube or

* The description of this process, and that of the formation of the corpus luteum by Dr. Montgomery, are so original that I give them entire. "The ovum is contained

human oviduct, where this gelatinous envelope swells out and acquires a much greater size, and

within the Graafian vesicle, which consists of two distinct membranous envelopes, the outer of which is the stronger and gives transmission to several blood-vessels, passing to the inner one, which is soft and more vascular. Besides these two coats of the Graafian vesicle, the ovum when leaving the ovary has to pass through two others, the proper coat of the ovary itself and its peritoneal covering."

"On the occurrence of conception, there immediately takes place a great determination of blood towards the ovaries as well as to the whole of the uterine system, and the coats of the Graafian vesicle, from which the impregnated ovum is to be discharged, become pervaded with a close net-work of vessels. The vesicle itself soon encreases considerably in size, and is thus, at once, pressed *outwards* towards the surface and against the peritoneal coat of the ovary; the close structure of the body of the ovary preventing the enlargement being accommodated *inwards*; at the same time, the inner coat of the vesicle becomes intensely vascular, and on its external surface, a soft, gelatinous substance of a yellowish, red colour, consisting apparently in part of blood and in part of lymph, is poured out (for the formation of the corpus luteum) between the two coats of the vesicle; in considerable quantity, all around, except at the point where it is pressed towards the external surface of the ovary, and against the peritoneum; for at this point the coats of the vesicle are thinner, and, apparently, without vessels, exhibiting a semitransparent spot analogous to the white line which is observed on the external surface of the capsules containing the yolk in the ovarium of the

subsequently becomes transformed into the chorion, or outer ovarian envelope of the ovum, while

bird, and along which the capsule opens when the vitellus is discharged into the infundibulum. The consequence of the formation of this new substance and its situation, must be, considerable compression from within, outwards of the inner coat of the vesicle, within which is the ovum and the fluid which always surrounds it, which fluid is thus pressed forcibly against the point where the thinned and unvascular portion of the vesicle is in contact with the peritoneum, which is thereby caused to project a little from the surface, so as to form a small nipple; absorption at the same time proceeds, and thus, by the combined agencies of the *vis a tergo* arising from the pressure caused by the formation of the corpus luteum, acting as it must, of necessity, do, towards the weak point of the vesicle and its peritoneal covering, and the natural tendency of the surrounding parts of the firm structure of the ovary, to close in, and restore themselves to their former condition, together with the effect of absorption, an opening is effected through the four coats surrounding the ovum, and its expulsion from the ovary into the tube accomplished. Thus, the vesicle, after impregnation, may really be said to become, with regard to the contained germ, a sort of little, temporary uterus, lined with a serous membrane, covered externally by another, and having, interposed between them, the fleshy or glandular structure of the corpus luteum; through which blood-vessels ramify, and exhale, through the lining membrane, a serous fluid for the support of the early ovum, which, as yet, lives by imbibition. From this temporary uterus, it is expelled in consequence of the increasing distention, by the pressure of the surrounding structure and corpus luteum; its

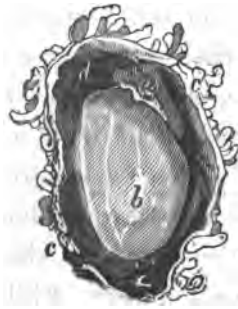
that which when lodged in the proligerous disc constituted the outer membrane of the ovum now disappears, and resolves itself into cellular or reticulated tissue. These views are exceedingly probable, and receive much confirmation from the examination, by the same enquirer, of a human ovum about the size of a large pea in the possession of Dr. Mackenzie, of Glasgow, where "the cavity of the chorion was filled with a fine gelatinous tissue, imbedded in which, towards one extremity of the ovum, was a small round body, the vesicular blastoderm, destitute of any vitelline covering." (See T. W. Jones's Paper, *Phil. Trans.* 1837.) A more complete demonstration of these views however seems desirable.

To recapitulate then briefly :—The ovum when impregnated consists at first of two vesicles, one placed within the other ; 1. The external, which either disappears as suggested by Mr. Wharton Jones, or according to Dr. Allen Thomson, constitutes the chorion ; and 2. The internal, the yolk, upon the surface of which the rudiments of the embryo are first formed when the yolk covered

envelopes bursting, and letting it pass through, to be received by the Fallopian tube and transmitted to the cavity of the true uterus." (*Exposition of the Signs and Symptoms of Pregnancy, &c. Lond.* 1837.

by the germinal membrane forms the yolk sac or umbilical vesicle.

The formation of the foetus on the yolk-sac is well seen in the wood-cut, Fig. 1. showing a



a The Embryo.

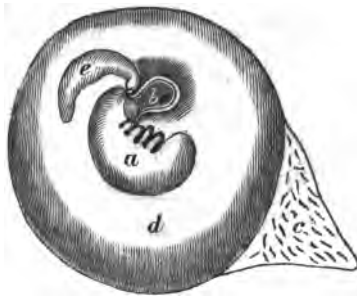
b The Umbilical Vesicle.

c The Chorion.

magnified view of an early ovum thrown off by abortion, where the minute embryo is still lying with its abdominal side flat on the surface of the umbilical vesicle. It was examined and figured by Dr. A. Thomson in his excellent paper on the early development of the embryo in the Ed. Med. and Surg. Journal, July 1839, and is now in the possession of Dr. Cumin of Glasgow.

As evolution advances, the embryo separates more and more from the umbilical vesicle, and the contraction and elongation of their common com-

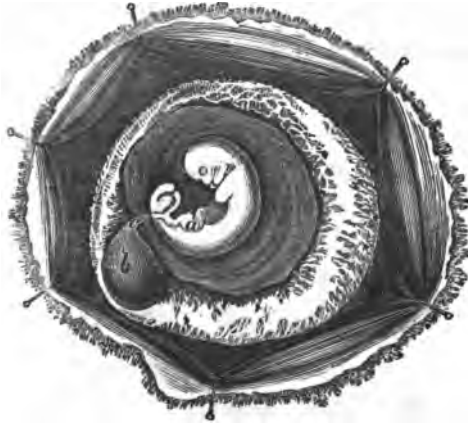
munication forms the vitello-intestinal duct. The existence of this communication was at first denied in man and the mammalia, but it is now too clearly proved to admit of any doubt. It is well seen in Fig. 2.



a Embryo. *b* Umbilical Vesicle.
c Reticulated Tissue. *d* Amnion. *e* Allantois.

This is taken from the account of an early ovum published by Baer in Siebold's Journal, Vol. xiv. 1835. I have seen an early ovum showing the same circumstance, which was figured in the Lancet, the Med. Gazette, and the London Medical and Surgical Journal, Nov. 1837, and formed part of the collection made by the late J. Miller; but in that specimen the amnion had not been opened, nor had the exact state of the embryo been ascertained. This duct is seen in a much

more advanced stage of separation, but still pervious, in Fig. 3. a normal but magnified ovum,



a The Intestine of the Embryo. *b* The Umbilical Vesicle.
c The Vitello-intestinal Duct.

The chorion has been opened and pinned back, and the umbilical vesicle is seen lying in the reticulated tissue between the chorion and amnion.

taken from Velpeau, where he himself pressed the fluid from the vesicle into the intestine of the foetus (Embryol. Fig. 5. Pl. 1.)

This vitello-intestinal duct, together with an artery and vein, constitute the pedicle of the umbilical vesicle, seen in a very natural state in an ovum in my own possession, (Fig 1. Pl. 1.) The artery and vein are the well known omphalo-meseraic or mesenteric vessels of which the late J. Miller the mechanic, so well known for his

anatomical enthusiasm, made the beautiful series of dissections from the embryos of the cat, the rabbit, and some early aborted human ova, and proved their persistency, as far as the umbilicus, in the human foetus up to the period of birth. These vessels were figured by Wrisberg in 1764. I have seen them dissected in a foetus at the tenth week in J. Miller's collection; the preparation figured in the *Lancet*, No. 762; and in the possession of Dr. Sharpey, there is a much earlier specimen, in which the duodenum has been cut through, and the vein is seen terminating in another vein just behind that intestine.

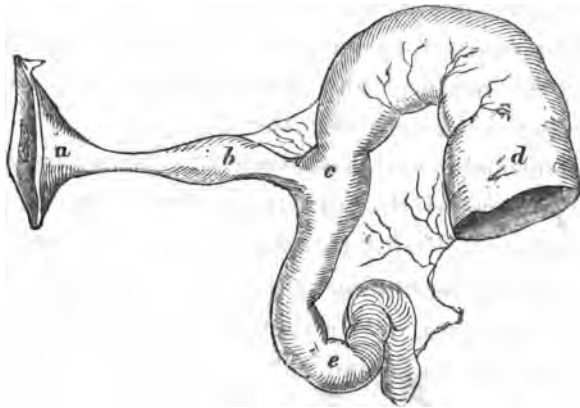
This separation between the embryo and the yolk-sac rapidly encreases; the amnion has now enclosed the embryo, and the nutritive materials for its evolution are no longer furnished by the yolk-sac, but derived from the mother through other channels; the office of the yolk-sac in the foetal economy has passed away, it withers, and becomes a useless vesicle. In this state it was first figured by Albinus in 1754, as an hydatid of the cord, and afterwards by W. Hunter, who named it the *Vesicula Alba*. The elongated duct first becomes impervious, then separates from the intestine, and finally, the filamentary connection of the artery

and vein alone remains to form the pedicle of the umbilical vesicle (Fig. 1. and 2. Pl. 1.)

The part of the intestine with which the yolk sac originally communicated has been the subject of some variety of opinion ; but here, as in many instances, malformations, the result of arrest of development, reveal what has earlier taken place,—those blind pouches connected with the ileum, which are named diverticula, mark as I conceive the original spot where the vitello-intestinal duct terminated ; and (Fig. 4.) the sketch of one taken from a man who died at the age of thirty-six, of inflammation of the bowels, and whose case is recorded by Drs. Hosack and Francis (*American Med. and Philosoph. Reg.* Vol. 1. 1814. New York) as a curious malformation of the ileum, seems to be an instance of the vitello-intestinal duct remaining persistent in the adult as far as the navel. This case is similar to what is occasionally seen in regard to the urachus, and is perfectly conclusive of the original termination of the duct in the ileum, and not in the duodenum or large intestines, as has been imagined. These diverticula unconnected with the navel are often seen in the human subject, and Professor Owen remarks, “that in many birds a small diverticulum is observed in the small intestine, which indicates the

place of attachment of the pedicle of the yolk-bag in the embryo." (Art. Aves. Cyclop. of Anatomy and Physiology.)

FIG. 4.



Malformation of the Ileum, showing persistency of a part of the vitello-intestinal duct in an adult.

a Connexion with the Umbilicus.

b Diverticulum.

c Connection with the Ileum.

d Upper portion of Ileum enlarged.

e Lower portion contracted.

While the ovum is undergoing the earlier changes consequent on impregnation, the uterus has a peculiar action set up within it, in consequence of which, it throws out a lining from its interior, which forms a sort of nidus for its expected occupant, the fecundated ovarian ovum,

as we will term it, for distinction's sake, before it has acquired its uterine envelopes; this nidus is the decidua first described with any thing approaching to accuracy by Dr. W. Hunter, but most completely, as I believe, by Velpeau.

The ovarian ovum quitting the ovarium gets into the oviduct, and passing along that tube, enters the uterus about the eighth day, but the time probably varies somewhat in different instances; it pushes this deciduous lining aside, (see Diagram 3. Pl. 3.) insinuates itself between the lining and the interior of the uterus, and glides, in most instances, only a short distance from the orifice of the Fallopian tube. It thus necessarily pushes inwards a portion of the decidua previously in contact with the interior of the uterus; this portion so protruded gives the ovum a close covering, except where that body is in contact with the uterus itself, and so forms the decidua reflexa, or ovine decidua. The part of the membrane where the reflexion takes place in a short time becomes firmly fixed to the uterus, attaches the ovum to it also, and circumscribes the naked portion of the chorion, the spot where the placenta quickly becomes evolved, as the permanent medium of nutrition and aeration during the remainder of intra-uterine life.

The uterine ovum therefore, as it may be termed, after its fixation to the uterus by means of the uterine and ovine deciduæ, consists of the following parts, describing them from without inwards, as is usually done. (See Diagram 4. Pl. 3.)

1. The uterine or true decidua (3), which forms a complete lining or perfect cast of the whole of the fundus and body of the uterus, a bag or capsule enclosing a fluid as yet unanalysed, and occasionally sending processes which are solid upwards into the uterine terminations of the Fallopian tubes, (2) and downwards towards the cervix uteri.

2. The reflected or ovine decidua (4), described by the Hunters as a continuous layer with the uterine, in a manner nearly similar but not so precise and correct as by Velpeau. This origin was called in question by Dr. Granville, when he addressed the Westminster Medical Society several years ago on the subject of abortion, and he then contended, and reiterates the opinion in his Graphical Illustrations, that it is a production of the ovarian ovum; he considers it to be the outer membrane of that body, the membrana corticalis of Baer, and proposes for it the name of *cortex ovi*; but his view of the origin and

subsequent transformation of this membrane is in my judgment erroneous.

These two coverings constitute the true uterine envelopes; within these are found the proper ovarian envelopes or productions.

3. The chorion (5), a membrane always more or less covered with villi.

4. A gelatinous cellular tissue (6), the reticulated tissue or allantoid sac of Velpeau, which must not be confounded with the allantois or urinary pouch of the mammalia. Imbedded within this reticulated tissue, and on the outside of the amnion is placed

5. The umbilical vesicle, the remains of the yolk-sac, upon which the embryo was originally formed, and by the fluid contents of which it was first nourished, possibly by means of yolk-vessels, similar to what Mr. Towne of Guy's Hospital has so elegantly demonstrated in the chick. It is the *vesicula alba* of Dr. W. Hunter.

6. The allantoid vesicle (see Fig. 3. Page 17, *c*) is probably placed within the same tissue as the umbilical vesicle. I have not myself seen this structure, and although it has been figured by Baer, by Coste, and by Pockels, its existence seems far from having been clearly demonstrated in the normal human ovum.

7. The Amnion (7), a membrane originally formed by the union of the cephalic and caudal folds of the germinal membrane. It now encloses the embryo (*f*), and is placed between it and the umbilical vesicle. (*i*)

The steps and stages by which the parts of the ovarian ovum pass into those of the uterine ovum, the first appearance of the vesicular blastoderm, and the earlier stages of the embryo's formation, are problems still awaiting demonstration *in* if not elucidation *from* human embryology. There are enquiries and disputes still pending concerning the existence and figure of the human allantois, regarding the process by which the amnion is formed, and especially from what part the chorion is produced, but these need not detain us from our main subject; there is only one disputed point which bears so strongly on practical considerations as to demand our attention. I mean, whether the decidua reflexa be a production of the uterus, as taught by the Hunters, by Denman, and by Velpeau; or of the ovarian ovum, as contended for by Dr. Granville. This is indeed important, because the treatment for preventing miscarriage in future pregnancies will be considerably modified according as we believe the

imperfections and diseases of this membrane to be the result of ovarian or of uterine lesion.

I have carefully considered all the circumstances adduced by Dr. Granville in corroboration of his view. They are, the rotundity of this covering of the ovum contrasted with the triangular shape of the cavity of the uterus, the difference of texture of the ovine decidua in many aborted ova from that of the uterine, the analogies of the pericarpium of certain seeds and of the outer shell of the ova in some of the ovipara. This examination has failed however to shake my allegiance to the views of the Hunters; indeed the only argument which appears plausible is the apparent difference of texture in certain instances between the two portions of the decidua, and this admits of easy explanation by viewing it as the result of disease or of infiltration of blood. When we find moreover that the observations of most inquirers, and analogy in all that is known concerning the evolution of the ova in mammalia, do not favour Dr. Granville's view, and finally, that the reflexa is by no means proved to exist in cases of extra-uterine foetation, we shall act most judiciously by regarding it for practical purposes as of uterine and not of ovarian formation.

Of the evolution and structure of the placenta I feel compelled to speak with the greatest hesitation. The data recorded are so contradictory, that it is impossible at present to arrive at accurate conclusions. The changes which the lining membrane of the uterus, apart from the decidua, undergoes during pregnancy, have not been satisfactorily marked. This membrane appears to have been often confounded with the decidua vera; and indeed the whole subject is still very obscure. I incline however to the opinion, that the mass of the placenta is furnished by the uterus, that a decidua serotina is formed, subsequently to the entrance of the ovum into the uterus, at the part where the chorion uncovered by the reflexa, is in contact with the uterus; and that this decidua serotina is principally, if not wholly, organized in its normal condition by vessels which shoot to it from the foetus, and form the cord. At an early period therefore the placenta is separated from the maternal system, and becomes essentially, as regards its life and growth, a foetal organ, one finally thrown off at birth along with that portion of the lining membrane of the uterus which gave it origin. Analogical circumstances in the placentæ of certain of the mammalia, the forma-

tion of placentoid bodies without the existence of a fœtus, and the uterus not usually participating in disease of the placenta, are the grounds of this opinion ; but as yet I consider it immature.

CHAPTER III.

NATURE, SYMPTOMS, AND CAUSES.

ABORTION may occur from the ovum not forming its normal attachment to the uterus after entering that organ. This failure of attachment is owing to a defective or imperfect formation of the decidual lining, but it far more commonly happens that miscarriage does not take place till after the ovum has become fixed to the uterus. The usual process of Abortion, therefore, consists,

1st, In the destruction of that membranous and vascular attachment which the ovum normally forms, by means of the uterine envelopes and the placenta, to the interior of the uterus.

2nd, In the dilatation and opening of the neck and mouth of that organ, and,

Lastly, In the extrusion of the unaffixed or detached ovum.

These parts of the process do not, however, commonly take place exactly in the order and succession here laid down, but they occur more or less simultaneously. If a rupture of the mem-

branes happens and the liquor amnii is discharged prior to the complete separation of the ovum from the fundus and body of the uterus, we shall hereafter see how much the rupture modifies both the process of extrusion and the treatment of the patient, how it adds to the danger, and has even led to a fatal result.

The exact nature of this attachment between the ovum and the uterus, which may be conveniently termed the utero-ovine attachment, varies somewhat, as was seen in the last chapter, with the period of pregnancy. At the commencement of gestation, when the connection is entirely decidual, we might easily persuade ourselves that the union between the ovum and the uterus was weak, and that accidental shocks would more easily destroy it than after the formation of the placenta had occurred; but the contrary seems to be the fact. Perfectly normal ova are very rarely thrown out of the uterus by abortion, during the earlier weeks of utero-gestation; they are, in fact, seldom met with before the middle and are most frequent of all in the later months of gestation. This circumstance is of itself sufficient to show that the natural connection between a healthy ovum and the uterus in the early stages of pregnancy is ample, and not easily broken; but the

same experience also shows that when the ovum is defective and the placenta not regularly formed, or becomes diseased, slight accidents may, and often do, lead to its complete separation and subsequent extrusion. When ova so thrown off are carefully opened, the fœtus will be found imperfectly evolved, withered, or entirely wanting.

The agents which produce partial or entire separation of the utero-ovine attachment are, *1st*, Muscular contraction of the uterus, which peels off the ovum from the interior of that organ. *2ndly*, An encreased arterial action which leads to extravasation of blood between the ovum and uterus. This extravasation necessarily produces mechanical separation, and leads to such irritation of the parturient organ as brings on expulsion of its contents. The symptoms therefore which essentially attend the process of abortion are two, namely, uterine pains of two kinds,—the pains of dilatation and expulsion; and the more formidable one of hæmorrhage.

Where the separation of the ovum results from vascular excitement of the uterus I believe a stage of premonition will have usually existed, too often indeed disregarded from the trivial inconvenience it occasions while present. It is marked, however, by sensations of weight, uneasiness and fulness

about the pubic, inguinal, and lumbar regions; by the sympathetic pains in fact which accompany congestions of the pelvic viscera, and these are not unfrequently attended by white or coloured discharge from the vagina, and by irritation of the alvine or urinary organs. There is a teasing diarrhœa or frequent and unusually pressing calls to relieve the bladder—evidences of an increase of sensibility in these organs to their ordinary stimuli, and which encreased sensibility is likely to extend to the uterus itself and set up expulsive action there.

Where the death of the embryo occurs in the early period of gestation, the essential symptoms of miscarriage are often preceded by a sudden and premature cessation of the customary morning sickness. In later periods a softness of the mammæ and a recession of the areolar changes when present, in many instances announce the approach of miscarriage. Where the placenta is withered as well as the fœtus, there is often super-added to these an offensive mucous discharge from the vagina for some time before the process of abortion actually begins. It is right, however, to state that the presence or absence of any of these symptoms cannot be looked upon as a certain diagnostic sign of the death or life of the fœtus ;

but collectively their presence amounts to a very strong presumption that the embryo has ceased to live, and that all attempts to prevent expulsion will prove unsuccessful, if not absolutely injurious, to the health and well-doing of the mother.

In entering on the consideration of the causes of miscarriage, I cannot forbear prefacing my own remarks with the excellent observations of Dr. Denman when writing on this subject. "According to the opinion of systematic writers," he says, "every action in common life has been assigned as the cause of abortion; and in general that about which the patient was employed when the first symptom appeared, is fixed upon as the *particular* cause, though probably she was before in such a state that abortion was inevitable."

I shall not task the patience of my reader with enumerating the long and tedious catalogue of the assigned causes of abortion. It will be sufficient for the purpose of this Essay to remark, that they are all resolvable into three great classes.

1st, An imperfect or abnormal formation of the ovum. This may take place either in the foetus or its membranes; or in the decidua and placenta, those structures which fasten the ovum to the

uterus and finally connect the embryonic and the maternal systems.

2ndly, Morbid states, functional or organic, of the uterus and its appendages.

3rdly, Morbid states generally of the constitution of the mother.

My own experience and all my enquiries lead me to believe that imperfect or abnormal formation of some part of the ovum, or of its connecting media, is by far the most frequent cause of early miscarriages. Every writer on embryology complains of his predecessors having mistaken abnormal for normal formation, and laments the extent of error which has sprung from this source. Every collection of ova passed by abortion furnishes demonstrative proof of the frequency and variety of malformations of the embryo and the membranes of the ovum. The figured specimens in the works of Dr. Davis and Dr. Granville, in this country, and those of Velpeau, Soemmering, Pockels, and other continental writers, all bespeak the same fact. This is however a point of so much importance in the treatment of miscarriage, that I have thought it expedient to illustrate it still further from my own collection. Pl. II. is a very accurate representation of an ovum which

was passed by a patient under my care. It is an example of imperfect development of the caudal extremity of the foetus, and is an instructive example, because all the membranes are visible ; but they by no means present the normal appearances ; the decidua reflexa *b b* is morbidly thickened, and presents a strong contrast to the fragment of healthy decidua *a*. The reflexa has been slit up and *c c* show its cut edges. The villi of the chorion *d d* are preternaturally enlarged, because the placenta has not been evolved ; the villi are also intermixed with coagula of blood. Fragments of the reticulated tissue situated between the chorion and amnion, and an umbilical vesicle, were very distinguishable when the ovum was first examined ; but no attempt has been made to delineate these delicate parts, because they are with difficulty seen since it has been preserved in spirit. The foetus *f* is floating in the delicate and comparatively small amnion which is still entire. As my patient had menstruated eleven weeks before miscarriage, and nearly a week intervened between the onset of hæmorrhage and the passage of the ovum, I am disposed to assign it an age of from six to eight weeks. It was her fifteenth pregnancy and third miscarriage. The cause she assigned was "overreaching" herself, but careful

examination of the ovum fails to establish any relation of cause and effect between the act of over-exertion and the miscarriage. The foetus is blighted, and the membranes have obviously undergone that series of changes which in such cases very commonly precedes the act of abortion.

The lower figure in Pl. I. represents another instance of foetal imperfection, which undoubtedly existed much earlier than the period of miscarriage. As far as I am aware it is nearly if not quite unique in this country, and belongs to that class of pathological ova which throws light on the origin of anencephalous monstrosities. The ovarian ovum came away with its membranes unbroken, and covered by a perfectly healthy reflexa. When this was dissected back, and an opening made in the proper ovarian envelopes (the chorion and amnion) a foetus of about six weeks' size was seen with a cephalic perforation. This opening, as the drawing shows, is circular in shape, and its marginal edges smooth and well defined. Through it the rudimentary portions of the brain were seen without any protective coverings. It would seem that one of the primary cerebral vesicles had enlarged and ruptured itself, and also the cranial integument. The objects are so minute and the cerebral structures so delicate, and so liable to have under-

gone alteration from maceration in the liquor amnii, that I shall not attempt to describe any of the cerebral appearances. The decidua vera was expelled in detached portions mingled with clots, but not, as often happens, till the following day. My patient had missed three menstrual periods, so that the age of the ovum is between nine and eleven weeks. It was her second pregnancy. In her first she gave birth after a very rapid labour to a living child. This however died two days afterwards, as inspection disclosed, from extravasation of blood at the basis of the brain, a circumstance which I believe often occasions the death of newly-born infants.

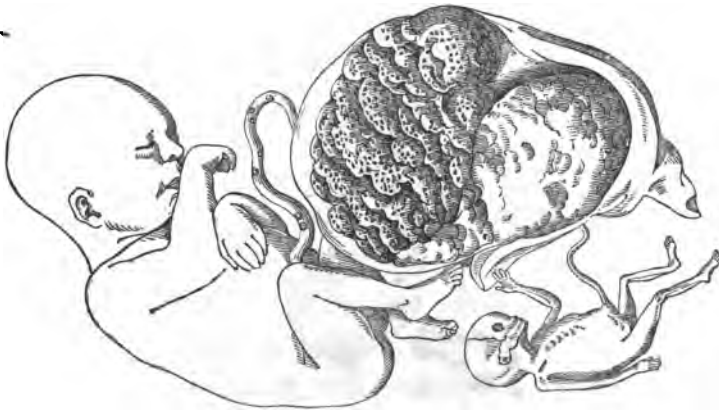
The death of the foetus, however, does not by any means lead to the immediate expulsion of the ovum. The latter does not usually happen till certain changes have occurred in the structures of the utero-ovine attachment consequent on that event, in the uterine envelopes principally during the earlier, in the placenta more exclusively at the later, periods of gestation. The cessation of foetal life must necessarily produce a great change in the vascular actions of these parts; and it seems reasonable to conclude that diseases should take place in their vessels analogous to those which precede the occurrence of extravasation of blood

in other parts of the body. I am therefore led to the conclusion that in most instances the extravasation of blood is not to be regarded as the cause of the death of the foetus, but that the death of the foetus gives rise to disease in the vessels, and to the subsequent extravasation which takes place between the chorion and reflexa, or at the site of the placenta.

The knowledge of this retention of the ovum after the death of the foetus is a most important point in practice, as it may under certain circumstances involve the reputation of the mother. It is also intimately connected with the pathology of those diseased ova which ordinarily receive the name of moles. In cases of twin conception, where the ova are not adherent, one foetus may die early and be expelled prematurely, while the other may be carried to the full term and be born alive; but if the placentæ, as more commonly happens, are united together, the dead foetus may lead to the premature expulsion of both, or it may be retained till the other is born alive. I have met with a case of the latter kind. The widow of a tavern-keeper, the mother of several children, married again after losing her first husband. She required my attendance 201 days after the marriage. A male foetus of about 5 months' growth

was first expelled, withered and flattened by pressure. One hour and a quarter afterwards she gave birth to a living girl, which only survived about six weeks. The union of the placentæ, which soon came away, showed the simultaneous conception of the fœtuses. Such cases have probably in some instances been mistaken for, and recorded as, cases of superfœtation.

The following wood-cut reduced from Cruveilhier, represents a nearly similar case of twins with conjoined placentæ. One is of the full development of the sixth month, while the other presents a size corresponding to not more than three months. He attributes the death of the fœtus to disease of the placenta, and the emaciated condition of the fœtus warrants the conclusion.



Dr. Montgomery, in his remarks on atrophy of the foetus, has especially alluded to the impropriety of dating a conception from merely viewing the size of the foetus without regard to the healthy or unhealthy character of the membranes of the ovum. The following wood-cut taken from the writer last named offers an excellent illustration in point. The foetus is of less than two months' growth, and the placenta about three; but five months had really elapsed from the time of conception, for the woman had not cohabited with her husband in consequence of miscarriage having been threatened more than three months before it actually took place.



These illustrations and remarks will suffice for concluding, with this practical writer, that "observation and experience force upon us the sad truth that the seeds of life are often sown adulterated with those of infirmity and decay,—that disease may mutilate and death destroy even before our entrance into life." The child before birth is not only liable to certain affections peculiarly its own, but to almost all those which affect the adult. "During the earlier periods, when the formative process is in most active operation, and while the development of different organs is proceeding rapidly, many important and remarkable organic alterations take place. Some of these arise from arrest of development in consequence of imperfections in the structures of the ovum; others from morbid alterations of those parts; and sometimes organs already formed are destroyed by atrophy or inflammation, or both conjoined."

It falls not within the proper limits of these practical observations to enter into minute details of the pathological conditions of the ovum in general. A physiological arrangement in reference to the causes of abortion would successively consider: The affections of the yolk-sac, of the chorion, of the reticulated body, and of the fœtus, and its more immediate envelope, the am-

nion ; next, those of the uterine envelopes, the decidua vera, and reflexa ; and lastly, those of the umbilical cord and placenta. I shall however so far digress as to remark, that in examining aborted ova, it is not uncommon on slitting up the chorion, to find two vesicles intimately connected and communicating, filled with fluid which in one instance remained transparent, in another threw down a large quantity of deposit when preserved in spirit. On mentioning this circumstance to Dr. Sharpey, he remarked, that it was not correct to assume that every vesicle found within a chorion was necessarily an amnion, for it might be a yolk vesicle. I am therefore led to regard the vesicle met with in one of the Velpeau's three early ova, in the one marked No. 2525.5, in Guy's Hospital Museum, and in several in that of University College, where there are vesicles contained within the chorion, not as instances of the presence of an amnion without a foetus, but as degenerated yolk-sacks. In an ovum in the collection of Mr. Wells, where the vesicle is double and intercommunicating, and also in a similar one in the possession of Mr. J. Gregory Smith, I consider that the germinal membrane had commenced its evolution, that it had proceeded so far as to form its cephalic and caudal folds, and that both yolk-

sac and embryo had undergone degeneration, and become mere vesicles.

The next class of causes inducing abortion comprises those which occur from disease of the uterus or its appendages. To this head must be referred cases where abortion arises in consequence of the irritability of the muscular fibres of the uterus being idiopathically exalted above the natural standard of health, or where the irritability of neighbouring parts, the bladder and rectum for instance, is so morbidly increased or so strongly excited as to involve by sympathy that of the uterus. All those cases which are usually termed accidental, and believed to arise solely from spasm or irregular contraction of the uterus peeling off the placenta, belong to this division. The so called apoplexies of the membranes or extravasations of blood between the uterus and ovum, and those effusions between the reflexa and chorion which gradually dissect up the reflexa from the chorion and form solid and tubercular-looking coagula, belong to this class. The diseases also of the interior of the uterus which lead to non-formation or imperfection of the uterine and ovine deciduæ, or after their formation to acute, subacute, or chronic inflammation of its lining membrane, especially of that part where the decidua serotina is evolved, and which partici-

pates in the formation of the placenta, the part which furnishes indeed what may be termed the uterine element of that organ. To inflammation of the interior of the uterus we must turn, as I conceive, for an intelligible explanation of hypertrophied or coriaceous states of the uterine membranes, for the origin of those pseudo-membranous formations external to the chorion which often cause so much perplexity in making out the real normal envelopes of the ovum, and for the production of those degenerated and solid ova which are termed moles. Lastly, we must refer to defective or morbid action of the same part for an explanation of those imperfections of the placenta which are so frequently found associated with fetuses emaciated to the greatest possible extent.

Madame Boivin has written a highly interesting monograph on the influence of organic disease of the uterus in the production of abortion. It however merits enquiry whether the act of abortion really takes place in such instances as she adduces while the utero-ovine attachment continues normal, or whether the organic disease only acts in a secondary manner by producing the states of the interior of the uterus before alluded to, and which finally lead to disease

of the ovum and premature expulsion. I have an ovum in my collection passed by a patient after missing three periods, who has a tumour in the right pubic region which I believe to be ovarian. The membranes in this instance are certainly morbid, a large quantity of blood has been extravasated between the chorion and reflexa, and the foetus is not more than of seven weeks' growth. I have also known a female in three successive pregnancies go to the full period of gestation where a fibro-cartilaginous tumour existed which eventually proved fatal by causing a laceration of the interior of the uterus.

Of the third class, the constitutional causes of abortion, I would observe that our systematic writers seem to have speculated on what *may* rather than have noticed what *has* really taken place. I have known simple and scarlet fever, small pox, epileptiform convulsions, hemiplegia from ramollissement of a large portion of the right cerebral hemisphere, sea-sickness in its most distressing form, influenza with its most harassing cough, and cholera in more than one instance when fatal, unattended with premature action of the uterus. Indeed every writer of practical experience adduces instances of remarkable retention of the ovum in fearful

casualties, and under violent mental emotions. I therefore believe that so long as the utero-ovine connection remains healthy, and the excitability of the uterus is not exalted above its natural standard, that abortion is not produced by constitutional disease, by organic disease of remote organs, or by general states of plethora or debility. Let me not, however, be misunderstood as under-rating the influence of constitutional disturbance in increasing the nervous susceptibility, or in exciting latent predisposition to disease in the uterine as well as in other organs. All that I mean to assert is, that general causes exercise no more immediate or specific influence over the uterus than over other important organs, as for instance over the heart, the stomach, and the brain. Some of the diseases enumerated, the exanthemata, for instance, may extend to the foetus and destroy it, and so cause abortion, but unless they first produce its death, abortion does not as a general rule ensue. For further information on the influence of small pox on the foetus in-utero I may refer the reader to a paper on the occurrence of small pox in pregnant women which I read before the Westminster Medical Society, in January 1838, a very full report of which will be found in No. 751 of the *Lancet*.

CHAPTER IV.

TREATMENT.

IN the preceding chapters I have endeavoured to describe the connection which exists in healthy gestation between the ovum and the uterus, and to arrange the various causes which tend to impair or destroy that connection, and eventually produce miscarriage. In the present I propose, by the aid of these physiological and pathological views, to arrive at those simple and intelligible general principles of treatment which with suitable modifications may be successfully adopted in the numerous varieties of cases that occur in practice.

When called to attend a female, who from any unpleasant occurrence, or from any premonitory sensations, is for the first time apprehensive of miscarriage, the accoucheur should first ascertain whether either of the essential symptoms of abortion, uterine pain, or hæmorrhage is present.

If the essential symptoms are not present, he should then carefully investigate the state of his patient, and whenever he finds any thing constitutionally or locally amiss, treat her precisely as he would if she were not pregnant. Where there is general plethora, or inflammation of any important organ, as of the brain, the lungs, &c. he must not abstain from the more active antiphlogistic remedies. Bleeding indeed, if not excessive, is usually borne well by pregnant females, and the whole of the treatment should be so chosen as not only not to excite but should be combined with such remedies as will allay irritation of the uterus. Active emetics, stimulating diuretics, and drastic purgatives, especially the aloetic, should be avoided, and the bowels cleared out and kept soluble by the milder laxatives or simple clysters. Some interval should elapse between the doses of purgatives, for these medicines when too quickly repeated are very apt to bring on expulsive action of the uterus. A full opiate may commonly be prescribed with advantage after the purgative action has been secured, and especially at bed-time. Cohabitation should be strictly forbidden, and as carefully abstained from during the whole period of convalescence.

When uterine pain has commenced, the use of

a full opiate, and especially of its repetition at bed-time for several successive nights, in preventing premature labour and miscarriage in the latter months of gestation, is fully established ; but the propriety of employing it in the earlier weeks and months is very questionable. There are undoubtedly a very few cases in which its use would be serviceable, but far more commonly its exhibition fails to produce the effect desired, the prevention of miscarriage, and then it leads to injurious consequences ; so that I now seldom employ opiates in any case where abortion is threatened *before* the third month of pregnancy is completed. When however in addition to uterine pain these early cases are attended with any hæmorrhage, I lay it down as a canon of treatment that the practitioner ought not to employ opium, or any drug that has the property of suspending or lessening uterine contraction. The results of enquiries show that miscarriage in almost all instances arises from causes over which, when its *essential symptoms* have set in, the accoucheur has lost all control. Fœtal or uterine disease or imperfection has accomplished its work of destruction, and the blighted embryonic thing must now be cast out from the womb. If the ovum is not so blighted, rest in the recumbent or horizontal

position, mental quietude, the abstaining from stimulating articles of food, the clearing out of the bowels by a simple enema or mild purgative, the administration of common salines, such as the citrate of potass with small doses of digitalis and hyoscyamus, will suffice to allay the symptoms. When however the ovum is blighted, it must necessarily be thrown off by miscarriage, and the suspending the uterine pains by the administration of opium only retards, and in too many instances disarranges, that process altogether. If therefore hæmorrhage continues or recurs after a few hours' trial of the above means, it seems to me that it then becomes a duty to ascertain by vaginal examination whether the os uteri has begun to dilate or not. If dilatation of this part has commenced, or if the hæmorrhage steadily encreases, even before it becomes profuse or tells upon the constitution, the ergot of rye should be freely and fearlessly employed in larger or smaller doses, and given at longer or shorter intervals according to the effects which it produces. The accoucheur should from time to time as gently as possible ascertain the extent of dilatation of the os uteri, remove all clots from the vagina, and dislodge the ovum if, as sometimes happens, it is merely adhering to the os uteri and keeping up hæmor-

rhage by the irritation which it occasions there. He should keep the room of a moderate temperature, give cool or positively cold drinks, and mild unstimulating articles of food. If the tone of the muscular system is failing from syncope, he should order port-wine negus, or brandy and ammonia sufficient to restore and sustain it.

Should the symptoms become alarming notwithstanding a steady perseverance in these measures, or have already become so from peculiarity of constitution, or the extent of the hæmorrhage before assistance was sought for, the practitioner must sit down at the bedside, he must trust nothing to attendants and friends, but devote a few hours to the preservation of his patient. He indeed that would treat uterine hæmorrhage successfully must have reduced the means of treatment to general principles. These means of treatment should be methodized and duly subordinated, like those which the surgeon calls in aid for arresting hæmorrhage from a wounded artery. As the thumb of the surgeon now almost instinctively tourniquets the sub-clavian or femoral artery in bleeding from a limb, so should the hand of the accoucheur seek to compress where it is possible, the abdominal aorta against the spine. Pressure there will certainly

restrain the uterine gush for the time, and we are assured on good authority that it often commands the hæmorrhage entirely.

The most effectual means however which the accoucheur possesses for preventing the further escape of blood from the maternal system in cases of abortion, is plugging the vagina. A choice of materials for this operation will not often be at his command, but ingenuity will seldom fail in finding something adequate to the purpose. An oiled silk handkerchief is probably the most convenient. Plugging stanches the bleeding by favouring the formation of clots, and so producing pressure over the open vessels of the uterus analogous to what takes place *in, upon, and around* a divided artery. The introduction also of the plugging material and the irritation of its presence powerfully tend to excite the uterus to that state of *tonic and active contraction* on which alone the permanent closure of the uterine vessels depends. In the earlier months there is little or no fear from internal hæmorrhage after plugging the vagina; for the uterus cannot then expand so as to contain much blood within it. In the later months any tendency to such expansion may be readily obviated by bandaging the abdomen, or

what is better, by simple pressure of the hand over the uterus.

Permanent contraction of the uterus can often be brought on and may nearly always be sustained by regularly repeated doses of the ergot of rye, and the use of cold and astringent injections into the rectum. Meanwhile the horizontal posture must be strictly enforced, since inattention to this has alone proved fatal. Ammonia must be freely applied to the nostrils, the face should be sprinkled with cold water, and all the ordinary measures employed to remove fainting, recurred to. In extreme cases compression of the larger arteries, as recommended by Mr. Wardrop, would probably prove advantageous. That of the abdominal aorta appeared to have been so in one of Latour's cases. Should these efforts succeed in restoring consciousness and the patient recovers her power of swallowing, the failing heart must be kept going by a judicious use of stimulants; the best I am acquainted with are port-wine and the preparations of ammonia. The kind attentions, collected manner, and consoling language of the medical attendant are to call forth and keep alive the cheering influences of the sentiments of hope and faith, and to dispel the fatally depressing one of fear.

When all these means fail, the danger is indeed imminent, and the ultimate resource is transfusion. Whether the blood with all its elements or that which has been deprived of its fibrine is to be preferred for this operation, must be left for future experience to decide. It is an investigation which merits being followed up. I am not aware that the transfusion of blood deprived of its fibrine has been tried except in animals, while that of the blood as it flows from a vein has been certainly performed with success in the human subject.

The hæmorrhage attending miscarriage will however under proper treatment seldom prove fatal. Dr. Denman has indeed recorded a fatal case, the one before alluded to, but the use of ergot was then unknown, and plugging the vagina was not practised. He moreover adds to the statement of its being unexpectedly fatal "the prognosis founded on the general event in such cases not giving reason to apprehend danger." The engraving in his work represents the ovum still adhering to the fundus uteri, and the membranes ruptured. I have myself seen several instances of hæmorrhage from abortion where unchecked at the beginning, become alarming, but I have never known one prove fatal. I will indeed venture to

assert from personal experience, that if the onset of uterine hæmorrhage in abortion be early met by the use of ergot and the non-use of paralysing opium, and by a studious care not to rupture the membranes, the case will rarely proceed to any alarming extremity. Let no one imagine that the effect of opium on the contractile power of the uterus may be undone or counteracted by the administration of ergot. Ergot, if it act at all, will not act in a kindly manner till some hours have elapsed, on a uterus once placed under the influence of opium, or even on one whose tone has been lost by long continued or profuse hæmorrhage, or by constitutional exhaustion from any cause. If however this medicine is early given, and in doses properly apportioned, it will not more often fail in regulating or exciting uterine contraction—Nature's ligature for the uterine vessels—than opium does in allaying spasm or the excitement of delirium tremens. Of opium Dr. Maunsell justly remarks, "that it is rather too much to expect from any drug that it will obey our pleasure in relaxing the uterus when we wish to turn a child, and in causing it to contract when we desire the expulsion of the placenta."

Should the membranes unfortunately rupture when the cervix is only partially opened, or be-

fore the separation of the ovum from the fundus and body of the uterus is complete, the liquor amnii is expelled, and if small the foetus also, and the partially separated membranes and placenta alone remain. If the separation from the fundus is complete, the membranes are often partially or wholly everted, and may be felt hanging out from and fringing the os uteri. The process of extrusion is now long retarded. The soft small or imperfect placenta is a very inadequate substitute for the cone which the ovum, when entire, forms for dilating the cervix uteri, and for overcoming the utero-ovine connection; and the clots of blood which form and become entangled in the torn membranes are little better as mechanical means for accomplishing this purpose. They indeed often fail entirely, and the separation of the ovum from the uterus is only finally accomplished by a process something analogous to putrefaction. If hæmorrhage continues, and the vagina is lax, and the cervix uteri sufficiently dilated, the introduction of a finger a little way into the uterus will often enable the practitioner to dislodge the ruptured ovum, but if this cannot be done by gentle means, the use of the plug is the preferable proceeding.

After the fifth month, the manual interference

employed for hæmorrhage at the full term may often be resorted to with advantage. In an instance where gestation had reached the sixth month, and the waters had broken, and the legs of the foetus, as far as the knees, had been expelled through a partially opened os uteri, the hæmorrhage became so alarming as to require active measures. Mr. Wetherfield and myself agreed in consultation, to introduce the hand into the vagina, and then to gently dilate the os uteri sufficiently to admit the passage of the foetal body and head. This was accomplished without much difficulty, the woman rallied during the process, her pains returned, and the foetus was gradually brought down along with the hand. The placenta was almost immediately removed, and she did extremely well.

It often happens however that after the rupture of the membranes the hæmorrhage ceases altogether, or becomes so trifling as not to influence the constitution, and the pains subside or entirely disappear. The most advisable practice when this happens, is to try and reach the inverted membranes, and to gently dislodge them with the finger; but if they tear, or the attempt at removal produces much pain, it is proper to desist; as long as there is no hæmorrhage it is better to wait,

to watch the patient carefully, and just before or as soon as putrefaction sets in, to frequently wash out the vagina and uterus with injections of tepid water. This removes the noxious secretions and decomposing matter, and greatly tends to allay or altogether keep down uterine irritation. In the mean time it is necessary to support the patient with nutritious but simple and unirritating diet, to keep her in the horizontal or recumbent posture, and to prescribe suitable constitutional medicines. The dilute sulphuric acid, small doses of the ergot, and the hen-bane and hop are useful remedies. Under this simple treatment, and with the precaution of injecting the uterus two or three times a-day, I have never known any injurious consequences from the retention of the membranes; and my experience has taught me to entertain little dread of the absorption of putrid matter into the maternal system in these cases, but they are tedious, and require care and patient attendance for a considerable time;—in fact the medical superintendence ought not to be remitted till the lochial discharge has ceased, and the catamenial secretion has taken place in a healthy manner.

It has been recommended in these cases to hook out the placenta and the membranes with a

small wire crotchet, or to seize the protruding parts with a pair of polypus forceps, and so extract them; but as we know not with certainty the cause of retention in any individual case, if required to interfere at all, I should prefer employing the continued injection of a stream of tepid water by Reid's syringe to using any manual or instrumental force. Extractive force might reproduce hæmorrhage, or light up inflammation, and, under certain circumstances of adhesion, produce laceration of the interior or inversion of the fundus of the uterus. When the complete extrusion of the ovum and its membranes has been accomplished by any of these means, the constitutional after-treatment will be nearly the same as that which is required after child-birth. If the hæmorrhage has been great there will be the same peculiar and distressing head-ache,—the head ache of exhaustion,—which so often attends convalescence after hæmorrhage from any cause. The peculiar treatment which the uterine system requires will be more conveniently considered in the next and concluding Chapter.

CHAPTER V.

PREVENTION IN ANY FUTURE PREGNANCY.

WHEN the natural course of gestation has been interrupted and the ovum prematurely expelled from the uterus by the process of abortion, one important object still remains for medical science to accomplish, viz. to restore the uterus to its healthy state, and thereby fit it for the reception and retention of an ovum till the full period, in any subsequent pregnancy. Before laying down any plan of treatment for ensuring this desirable object in particular instances where miscarriage has occurred, I hold it is essentially necessary, that the ovum which has been expelled, whether it has come away entire or in fragments, should along with its envelopes be submitted to a minute and careful examination. This is most conveniently done after the ovum has been suspended for a few hours in a large vessel of water, so as to allow the colouring

matter of the blood to disengage itself and subside to the bottom ; and indeed the whole examination is most distinctly and satisfactorily conducted under water. The practitioner who fails to institute this examination neglects one of the most precise sources of information which lies within his power. Without this preliminary step the exact cause of miscarriage cannot be ascertained, and any plan therefore for preventing the recurrence of abortion in a future pregnancy, can only be framed on uncertain conjecture instead of being based on positive fact. This enquiry indeed seldom fails to disclose whether the process of utero-gestation has failed, because the ovum was itself originally in an imperfect or pathological condition, or because the foetus, having been regularly formed and nourished up to a certain period, has subsequently perished in consequence of imperfection or disease in the uterine envelopes or placenta. The distinction between foetal and maternal causes should never be lost sight of during the after-treatment of cases of abortion, and in the management of pregnancies which take place after miscarriage has once occurred.

When examination shows, as it commonly will during the first three months of gestation, that abortion has arisen from inherent imperfec-

tion in the ovum uncomplicated with uterine disease or hæmorrhage, the after-treatment required is of the most simple description: the lochial discharge in general quickly subsides, the catamenial secretion is re-established in due time, and impregnation usually takes place again at no very distant period. According to my experience females seldom have a long succession of imperfect ova without an intermixture of perfect ones, and unless the uterus is itself in fault, the perfect ova are retained till the full term of gestation is accomplished. This circumstance must be regarded in some respects as fortunate, for the process by which the ovum is formed in the ovary, like most of the actions morbid or otherwise which take place within that organ, is so little under the influence of medicine, and the changes which the ovum undergoes and the additions which it unquestionably receives during its passage through the fallopian tube are so entirely beyond control, that the female must in any future pregnancy be managed as she would have been had she never miscarried.

When however, as most commonly happens after the third month, we find effusions of blood or traces of inflammatory disease in those membranes which are derived from the uterus or in the

placenta, the patient must at once be placed under appropriate treatment. So soon as the immediate danger from hæmorrhage or draining is over, the injection of tepid and bland fluids into the vagina will be serviceable, and such constitutional treatment as the general state of the system indicates must be instituted. The catamenial secretion does not usually reappear without deviating obviously from the natural character. It is commonly more or less abundant than usual, and its appearance is preceded or accompanied by local pain and constitutional disturbance. The usual remedies for these symptoms will be required while they are present; and between the periods great benefit is often experienced from a course of alcalies or mild alteratives, and a steady use of the hip-bath. The morbid state of the interior of the uterus is however seldom completely removed without the strictest attention to diet, change of air, and a long and uninterrupted cessation of cohabitation.

When a female who has once miscarried in consequence of inflammatory disease of the uterus again becomes pregnant, the utmost care will be required to prevent miscarriage from again taking place. She must submit to an antiphlogistic regimen, the bowels must be carefully regulated,

and bleeding followed by an opiate should be occasionally employed as a measure of precaution, and especially whenever symptoms of general or uterine plethora show themselves. Bodily quietude should be preserved, but not carried so far as to bring on mental or constitutional irritability. Gentle walking in the air will usually be advantageous in the earlier period of the pregnancy, but the recumbent position should be maintained during the greater part of the day, and especially insisted on a short time before and after the period of pregnancy corresponding to that of the miscarriage. Any obvious irregularity in the functions of the pelvic viscera should be early noticed, and appropriately treated. This plan, where strictly followed, will in many instances prove successful ; but it is right to add, that it will almost certainly fail where the parties persist in cohabitation.

Examination in some few instances shows no appreciable disease or imperfection of the ovum or its membranes, and then the miscarriage must be assigned to a morbid excitability of the uterus. Morbid irritability of the uterus is, I believe, seldom the sole or immediate cause of abortion till the utero-ovine connection has become almost wholly placental, and this is not the case till after the fifth month of gestation has commenced. It

is indeed the most frequent cause of labour coming on prematurely after women have experienced accidents, or sudden and severe mental emotion ; but its presence in the earlier months predisposes more to irregular determination and congestion of blood, and consequent effusion on the membranes, than to any irregular and expulsive action of the muscular fibres of the uterus.

The treatment required immediately after abortion has taken place in these cases is very simple ; with rest in the recumbent posture all usually goes well, and the proper uterine functions are soon resumed without any deviation from health. If, however, the over-excitability of the uterus continues, and is not combated and removed before pregnancy again occurs, miscarriage will almost certainly be threatened upon occasion of any mental or bodily disturbance. Indeed miscarriage often takes place in spite of all that can be done in a series of successive pregnancies, until the tone of the uterine fibres has been lowered by distension, and their susceptibility to contraction has been thereby lessened.

The most effectual means for removing morbid susceptibility of the uterus, and the constitutional debility with which it is usually associated, is a temporary residence near the sea-coast, and the

use of tepid or cold sea water baths. To some patients the milder air of an inland watering-place and a course of natural chalybeates will be more beneficial. Where, however, circumstances do not admit of such a change of residence, great benefit will be often experienced from an occasional use of the shower-bath, and the exhibition of quinine, the preparations of steel, or the milder tonics combined with alkalies, and in some instances the mineral acids. Where the general health is not impaired, and the increase of nervous susceptibility is confined to the uterine system, great reliance may be placed in the administration of alkalies joined with such medicines as the uva ursi, hyoscyamus, and conium, and the use of a shower-douche over the loins; soothing injections per vaginam, and the general warm-bath or the hip-bath, are also serviceable.

If pregnancy takes place before the susceptible state of uterus is removed, the chief, if not the only means upon which reliance can be placed for preventing a premature expulsion of the foetus, will be the timely and persevering use of opium. Whenever uterine pain occurs this medicine must be administered. It should of course be exhibited in that form which is most congenial to the patient's constitution, and

its unpleasant effects as far as possible obviated by a judicious combination with other medicines.

I have now pointed out the three great subdivisions of abortion which are clearly revealed by a pathological examination of aborted ova, and I have also described the plan of treatment which is peculiarly adapted to each of these subdivisions. There now remain for consideration only those cases that are of a mixed character, and which not unfrequently present themselves in practice. An inherently defective ovum, for instance, is found accompanied with either an irritable or an inflammatory condition of the uterus; or again, an inflammatory state of the uterus may coexist with an irritable one. The latter indeed is not uncommon, for whenever any acute affection of the uterus is present, it is attended with disturbance of the nervous system in general, and with exaltation, diminution, or perversion of the susceptibility of that of the uterus in particular.

In every case where abortion has arisen from a combination of the above-named causes, a mixed plan of treatment must be directed. This should partake more largely of the character of that which is in use for subduing inflammation on the one hand, or for allaying irrita-

bility on the other, according as the symptoms and appearances of the aborted ovum proclaim the one or the other state of the uterine system to predominate. When pregnancy occurs in connection with both an inflammatory and irritable state of the uterus, the plan for preventing a recurrence of abortion will consist in early and moderate bleedings alternated with the use of opium, and an entire abstinence from cohabitation. The secretions of the bowels should be carefully regulated, the patient restricted to an unstimulating but moderately nutritious diet, and all kinds of exertion avoided except exercise of the gentlest description. Finally, the recumbent position should be very generally kept, and always had recourse to on the earliest appearance of any symptom indicative of threatened miscarriage.

However unpromising the result may appear in consequence of the repeated occurrence of miscarriage on former occasions, a repetition of prophylactic measures should always be resorted to, as often as pregnancy occurs. These measures, indeed, when applied in time and judiciously persevered in, will on many occasions overcome the predisposition to miscarriage, and safely conduct the patient to the extreme term of

utero-gestation, when the ample reward for their observance will be reaped by the gratification of giving birth to a living child.

The practical value which I have attached to the information derived from the examination of aborted ova may by many practitioners be thought over-rated. They have perhaps regarded the pathology of the ovum as a subject altogether more curious than useful, but when they have adopted the indications which it affords, they will soon recognize its worth in practice. A knowledge of the structure, functions, and diseased appearances of the ovum is indeed a part of science which is indispensable to the accoucheur. It is by the aid of this knowledge that he is enabled to discover the cause of miscarriage, more accurately than by any other means. It is moreover both useless and unscientific to subject patients threatened with miscarriage, whether in consequence of inherent defect in the ovum, of inflammation of the interior of the uterus, or of an over-excited state of that organ, to a precisely similar plan of treatment. The means which are essentially necessary for restoring the uterus to a healthy performance of its allotted functions, those, namely, of menstruation and gestation, where inflammation of its

interior has occasioned recent miscarriage, are entirely superfluous where the ovum has been expelled solely because it was defective and incapable of evolution. By an accurate acquaintance with pathological conditions in this as in all other instances, our knowledge of morbid actions becomes more exact, and our treatment is more precise, more unhesitatingly pursued, and consequently more successful. The distinction between embryonic imperfection and uterine disease in particular ought always to be made in cases of abortion; but the distinction between inflammation and irritation also, which is so carefully insisted upon in the treatment of disease in other organs, is no less essential in regulating the functions of that most important part of the female economy, the uterus, whether it remains in the unimpregnated state, or is engaged in the no less natural but more interesting process of aiding in its evolution the future representative of the species.

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